



Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

it counteracts) be denied, all changes that take place contrary to the observed analogy of nature must be *events without a cause*; and if one such event can take place, any others might, and consequently the whole system might have had no superior designing cause; and if there be any such thing as *atheism*, this is certainly it.

Dr. Darwin speaks of his organic particles as possessed of certain *appetencies*, or *powers of attraction*. But whence came these powers, or any others, such as those of electricity, magnetism, &c.? These powers discover as much wisdom, by their adaptation to each other, and their use in the general system, as the organic bodies which he supposes them to form; so that the supposition of these *powers*, which must have been imparted *ab extra*, only removes the difficulty he wishes to get quit of one step farther, and there it is left in as much force as ever. There are still marks of *design*, and therefore the necessity of *a designing cause*.

No. XXV.

Observations on the Discovery of Nitre, in common Salt, which had been frequently mixed with Snow, in a Letter to Dr. Wistar, from J. Priestley, L. L. D. F. R. S.

Read, December 2, 1803.

DEAR SIR,

WHEN I had the pleasure of seeing you at Northumberland, I mentioned a fact which I had just observed, but which appeared to me so extraordinary, that I wished you not to speak of it till I had more completely ascertained it. It was the conversion of a quantity of common salt into nitre. But having seen, in the last *Medical Repository*, an observation of Dr. Mitchell's, which throws some light upon it, I think it best upon the whole to acquaint experimentalists in general with all that I know of the matter; that, as the experiments must be made in the winter, they may take advantage of that which is now approaching.

In the winter of 1799 I made those experiments on the *production of air from the freezing of water*, an account of which is published in the 5th Vol. of the Transactions of the Philosophical Society of Philadelphia, p. 36; And having made use of the same salt, mixed with snow, in every experiment, always evaporating the mixture till the salt was recovered dry, I collected the salt when I had done with it, and put it into a glass bottle, with a label expressing what it was, and what use had been made of it.

This quantity of common salt having been frequently dissolved, and evaporated in an iron vessel, remained till the 26th of last October; when, having occasion to make a large quantity of marine acid, and this salt appearing to be of little value, I put to it an equal weight of acid of vitriol and about twice the quantity of water, and began the distillation in the usual way. But I was soon surprized to observe that *red vapours* rose from it, first filling the retort, and then the adopter, &c. and when the process was finished, returning to the retort, exactly as in the process for making spirit of nitre.

Not doubting, from this appearance, but that the produce was the nitrous acid (though having used much water, the acid was of course weak, and nearly colourless) I immediately dissolved copper in it, and found that it yielded as pure nitrous air as any that I had ever procured in the same way.

Examining the salt separately, I observed that when it was thrown upon hot coals, whether those portions of it that were white, or those that were brown from a mixture of the calx of iron, it burned exactly like nitre; so that from this appearance, I should have concluded that it had been wholly so. But that it contained some marine salt, and that the acid procured from it had a mixture of the marine acid, could not well be doubted; and this appeared to be the case both by the acid becoming turbid by a mixture of the solution of silver in nitrous acid, and by its dissolving gold with the application of heat, so that it was a weak aqua regia.

This conversion of common salt into nitre appeared so extraordinary, that I first thought there must have been some mistake in the *label*, though few persons I believe are more

careful in that respect than myself. But I never had any nitre of that appearance, and least of all any that had in it a mixture of common salt; so that I could not doubt but that this was the same salt that I had used before for the purpose above mentioned. That this change must have come from the *snow* with which it had been dissolved, could not be doubted; and therefore I resolved to repeat the experiment with the next that should fall, but seeing that Dr. Mitchell had procured an acid from hail stones, I was instantly determined to excite other persons to repeat the experiment as well as myself, having now more confidence in my own.

What was the acid that Dr. Mitchell procured he did not ascertain, mine was unquestionably the *nitrous*, and it must have displaced that of the common salt by a superior affinity to its base. This acid must be exceedingly volatile; for I could not produce the same effect by repeated solutions and evaporations of the same kind of salt in snow water of long standing, a quantity of which I have always had, to use occasionally instead of distilled water.

The manner in which nitrous acid may be formed in the atmosphere is easily explained on my hypothesis of the composition of that acid; since I have always procured it by the de-composition of dephlogisticated and inflammable air, together with a small mixture of marine acid (which must therefore be formed from some of the same elements) as Mr. Cavendish procured it by the de-composition of dephlogisticated air, both of us using electric sparks.

Now it is probable that, although most kinds of air, even those that have no chemical affinity, will remain diffused through each other, without any sensible separation, after being mixed together, yet in the upper regions of the atmosphere, above that of the winds, there may be a redundancy of inflammable air, which is so much lighter than any other kind of air, as Mr. Kirwan and others suppose, and that there is a proportion of dephlogisticated air, in the same region cannot be doubted. In this region there are many electrical appearances, as the aurora borealis, falling stars, &c. and in the lower parts of it thunder and lightening; and by these means,

the two kinds of air may be de-composed, and a highly de-phlogisticated nitrous acid, as mine always was, procured.— This, being formed, will, of course attach itself to any snow or hail that may be forming in the same region at the same time, and by this means be brought down to the earth; confirming, in this unexpected manner, the vulgar opinion of nitre being contained in snow. Wishing that a fact of so extraordinary a nature, and which has probably more important consequences than I can foresee, may be farther investigated by your presenting this communication to the Philosophical Society.

I am, Dear Sir,

Your's sincerely, &c.

JOSEPH PRIESTLEY.

Northumberland, Nov. 21st, 1803.

Dr. C. Wistar, one of the }
V. P. of the A. P. S. }

No. XXVI.

A Letter on the supposed Fortifications of the Western Country, from Bishop Madison of Virginia to Dr. Barton.

Read Dec. 16th, 1803.

DEAR SIR,

HAVING lately visited that beautiful river, the Kanhawa, and a considerable part of the country, within its neighbourhood, an opportunity was afforded of examining with attention some of those remarkable phænomena, which there present themselves, and which have been so much the subject of conversation, and of literary discussion. To remove error of whatever kind, is, in effect, to promote the progress of intelligence; with this view, I will endeavour to prove to you, that my journey has enabled me to strike one, at least, from